

the same material, but may be differently doped. The quantity of layer impurity (i.e., dopant) is very small relative to the layer base material. Accordingly, layers composed of the same material inherently have band gap energies that hardly differ, even if the dopant impurity is altered. In the claimed embodiment of the present invention, both the n-type clad layer and the barrier layers are formed of GaN, *i.e.*, the base material forming the layers is naturally the same. Accordingly, the band gap energies of the layers hardly differ.

The recitation that the layers are formed of substantially the same material inherently excludes combinations of an n-type clad layer and barrier layers where the band gap energy of the barrier layers greatly differs from the band gap energy of the n-type clad layer. Composition of the base material forming a layer largely affects the band gap energy of the layer. Accordingly, layers having substantially different band gap energies are not formed of substantially the same material. Nakamura discloses a nitride semiconductor device including n-type layer 201 formed of a base material “having a band-gap energy larger than that of the active layer 16 (more strictly, its well layer).” (Column 10, lines 10-14.) The Office Action interprets this to mean that Nakamura “only requires” that the n-type layer 201 has a band gap energy larger than that of the active region’s well layers, and that the n-type layer 201 of Nakamura allegedly “would include bandgaps which are the same as the barrier layer (for the situation where the barriers and tunneling/clad are of the same material).”

However, Applicants submit that what Nakamura “would include” is not what Nakamura discloses. Applicants respectfully submit that Nakamura fails to disclose an n-type layer having a band gap of substantially the same energy level as the barrier layer. The disclosure in Nakamura that the n-type layer 201 has a band-gap energy larger than the active layer 16 (more strictly, its well layer) does not disclose any relationship between the band-gap energy of the n-type layer 201 and the band-gap energy of the barrier layer. In particular, it does not disclose that they are substantially equal and does not disclose equalizing of the

energy level between the two layers. To the contrary, Applicants submit that, in consideration of Nakamura's disclosure, it is clear that the band gap energy of the n-type layer 201 inherently is larger than not only the well layer, but also the barrier layer of the active layer 16.

For example, Nakamura illustrates in Fig. 5 that there is a large difference between the band gap energy of the barrier layer and the band gap energy of the n-side layer 201. Accordingly, the n-type layer would not be formed of a material substantially the same as the barrier layers, as recited in claim 1, because Nakamura discloses an n-type layer and barrier layers with band gap energy levels substantially different. Furthermore, Nakamura employs a tunneling effect in layer 201 which is thin to achieve easy flowing of carriers into the light emitting layer and has a large band gap energy to achieve a carrier confining effect. Applicants submit that n-type layer 201 would inherently have a higher band gap energy than the barrier layer in view of this.

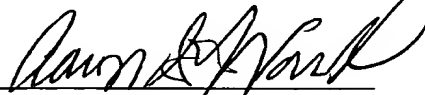
As such, Nakamura fails to anticipate claim 1. Claims 4-6 depend from claim 1. Applicants have discussed above how independent claim 1 is distinguished and allowable over Nakamura. By virtue of their dependence from claim 1, rejected claims 4-6 also include this subject matter. As such, dependent claims 4-6 are allowable for at least the same reasons as independent claim 1. Reconsideration and withdrawal of the rejection of claims 1 and 4-6 are respectfully requested.

All of the stated grounds of rejection have been properly traversed. In view of the foregoing, the claims and specification are in form for allowance, and such action is hereby solicited. If the Examiner believes, for any reason, that personal communication will

expedite prosecution of this application, the Examiner is requested to call the undersigned at the number provided.

Respectfully submitted,

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